Purpose
The Ahmed Glaucoma Valve (AGV) is increasingly used for the treatment of refractory glaucoma. Although the AGV is a restricted device with a valve-like mechanism that should prevent early overfiltration, early postoperative hypotony is reported in variable rates. The aim of this study was to assess a test procedure of the valve mechanism.

Methods
In 30 consecutive cases of implantation of an AGV, the device was tested for its opening and closing pressure before use. After priming the device as recommended with balanced salt solution, the canula with the attached tube of the AGV was connected to an infusion bottle. The bottle height had been adjusted previously so that the pressure in the system was zero. Afterwards, the pressure in the infusion bottle was increased gradually using the active infusion pump of an Oertli Phako Machine OS3 (Oertli Instrumente AG, Switzerland) until flow through the valve of the AGV was noted (opening pressure A). Then the pressure was reduced again until the flow stopped (closing pressure B). Afterwards the pressure was increased again until flow was noted again (opening pressure C). Intraocular pressure was then checked postoperatively on the same day. The differences between pressure A - B, between C - B, and A - C were calculated. Means and standard deviations were computed. Low postoperative IOP was defined as any value of 4 mmHg or lower. Each of the pressure parameters and the differences was assessed against low IOP (dependent variable) with univariate analyses.

Results
Mean (SD) opening, closing and re-opening pressures (mmHg) were 18.4 (5.1), 8.3 (4.7) and 11.7 (4.8), respectively. 10 patients (33.3%) had low IOP. The opening pressure (OR 0.55 [95% confidence interval CI 0.35-0.87; p= 0.010) the re-opening pressure (OR 0.56 [95%CI 0.37-0.84; p=0.006]) and to a lesser extend the closing pressure (0.61 [95% CI 0.41-0.9; p=0.013]) were associated with low IOP. An opening pressure value of 18 mmHg or less had a sensitivity (6/6) of 100% (95%CI 69.2-100) and a specificity (10/13) of 76.9% (95%CI 44.1-85.9) to identify low IOP.

Conclusion
In the preoperative assessment of silicone AGV a substantial variability of opening, closing and re-opening pressure was observed. Pre implantation assessment of the valve function is recommended. An opening pressure of 18 mmHg or less, identified all patients developing postoperative low IOP. If confirmed in larger studies, this threshold should trigger a change of AGV.

References

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frank.bochmann@luks.ch